

COMMERCIAL AND INDUSTRIAL EQUIPMENT GLOSSARY

ELECTROSTATIC AND MEDIA FILTERS

ACCELERATION LOSS: the amount of energy required to induce airflow at the entry of a system.

ACFM: actual cubic feet per minute; the quantity or volume of a gas flowing at any point in a system. Fans are rated and selected on the basis of ACFM, as a fan handles the same volume of air regardless of density.

ABSORPTION: the process of one substance entering into the inner structure of another.

ADSORPTION: adhesion of a thin film of liquid or gases to the surface of a solid substance.

AEROSOL: an assemblage of small particles, liquid or solid, suspended in air. The diameter of the particles may vary from 100 microns down to 0.01 micron or less, e.g., dust, fog, smoke.

AGGLOMERATE: the grouping of smaller particles into a larger mass.

AIR BALANCING: the process of regulating airflow to achieve the desired flow throughout the duct system.

AIR CURTAIN: a mechanical device designed to limit the flow of unwanted air in a particular area.

AIR FLOW: in-line movement of a stream of air.

AIR VELOCITY: rate of speed of an airstream, expressed in feet per minute.

AMBIENT: immediate surroundings or vicinity.

AMCA: Air movement and control association.

ARC-OVER: term used to describe the electrical current jump or sparking between areas of opposite potential.

ARC-TRACKING: term used to describe the groove or track in an insulator as a result of arc-over. This track allows for a collection point for conductive material and results in more frequent arc-over conditions.

ASHRAE: American Society of Heating, Refrigeration, and Air Conditioning Engineers.

ASHRAE TEST STANDARD 52: test used to compare efficiencies of filters designed to collect dust particles. Includes standards for Atmospheric Dust Spot and Arrestance Testing.

ASPECT RATIO: the relationship of width to length.

ATTENUATION: adsorption of sound pressure. Attenuation reduces the amplitude of a sound wave without altering the frequency.

AXIAL FLOW: in-line air movement parallel to the fan or motor shaft.

BACKDRAFT DAMPER: damper used in a system to prevent airflow in a given direction.

BALLING: term used to describe the infrequent buildup of airborne material on the tips of the spiked ionizers.

BI FAN: describes a fan with backwardly-inclined blades.

BLOW THROUGH: contaminate that passes through a collector, usually as a result of high velocity or heavy loading.

BREAK HORSEPOWER (BHP): the amount of mechanical energy consumed in a system.

BRIDGING: the buildup of collected material across two or more collector plates resulting in arc-over.

CAPTURE VELOCITY: air velocity necessary to overcome opposing air currents or natural airflow and cause contaminated air, fumes, or particles to flow in a desired pattern.

CARTRIDGE FILTER: pleated cellulose, synthetic fibers or a combination of the two used to collect air borne particulate matter. Typically a cylindrical tube with the airstream drawn from the outer surface inward with the filtered air exiting through the core of the filter. May be cleaned with a reverse pulse of compressed air to extend the collection life of the cartridge.

CFM: Cubic feet per minute; the volume of airflow for a given fan or system.

CLOSED LOOP: a system employing a filtered and recycled cleaning medium to flush collected material off the ionizer-collector cell surfaces.

COALESCE: the gathering of smaller liquid particles into a larger grouping.

CONVEYING VELOCITY: the air velocity required in a duct system to maintain entrainment of a specific material.

COLLECTOR CELL: assembly containing the ionizer, repelling and collector plates, which collect and remove particulate matter from the contaminated airstream.

COLLECTOR PLATE: portion of a cell used to attract and retain a particle from the airstream.

CONTAMINATE: any material or gas, fume, vapor or particle that pollutes an airstream.

CONTROL CABINET: electrical enclosure used to house, power supply, clock/timer, PLC, wash controls and terminal strips.

CSA- CANADIAN STANDARDS ASSOCIATION: sets safety standards for equipment used in Canada.

DAMPER: a device used to modulate airflow throughout a system.

dba: sound-pressure level in accordance with the "A" scale of measurement.

DEW POINT: the temperature at which condensation begins to form when air is cooled.

DFT: dry film thickness.

DILUTION VENTILATION: mixing of contaminated air with uncontaminated supply air to obtain a desirable contaminate level.

D.O.P.: Dioctylphthalate aerosol, material used to test efficiency of a very high efficient filter. Typically used as a standard to test equipment used to collect ultra fine particles or oil mists.

DUST: air suspension of particles of any solid material. Typically refers to particles or aerosols smaller than 100 microns.

DWELL TIME: the amount of time that a particle has to travel past a collector plate in a cell.

EFFICIENCY: a comparison of the amount of material entering verses leaving an air cleaner.

ELECTROSTATIC PRECIPITATOR (ESP): a highly efficient air cleaner used to collect: solids and liquids. This filter consists of two elements an ionization section and a collecting plate section. In the ionization section, small diameter wires or specially designed plates with a positive direct current potential between 6 and 25kV are suspended between ground electrodes. The high voltage on the ionizer plates creates a field to charge the contaminate particles. The positive ions created in the field flow across the airstream and strike or adhere to the particles, imparting a charge on them. The particles then pass through the collector plate section. The collector consists of a series of parallel plates equally spaced with a positive DC current of 4 to 10kV applied to alternate plates. Plates that are not charged are at ground potential. As the particles pass through the collector section they are forced to the collecting plates by the charge that they carry and are thus removed from the airstream. The particles are retained on the collector plates by a combination of electrical and intermolecular forces. Collector cells typically operate with a 120volt AC line voltage and draw 20 to 40 watts per 1,000 cfm of air cleaner capacity. An ESP can achieve 99+% efficiency if properly designed and maintained.

ENTRY LOSS: the loss in pressure caused by air flowing into a system, normally expressed as a function of velocity pressure.

EXTERNAL STATIC PRESSURE: the required static pressure to overcome resistance in the ductwork, capture hoods, dampers, etc.

FACE VELOCITY: air velocity entering a collector cell.

FAN: a power driven machine that moves a continuous volume of air.

FAN CLASS: operating limits at which a fan must be physically capable of operating safely.

FAN CAPACITY: performance requirement for which a fan is selected to meet specific system calculations given in terms of ACFM at the fan inlet.

FIRE RETARDANT: chemical treatment to reduce the combustible properties of a filter media.

FPM: Feet per minute, typically used to describe the movement of airflow in a given direction.

FRAME SIZE: a common set of measurements used to describe the physical characteristics of a motor.

FRICTION LOSS: resistance to airflow in a duct or fitting, generally defined in terms of static pressure.

FUMES: airborne particles, usually less than 1.0 microns in diameter. Formed usually as the result of chemical vapors or a thermal process.

GAS: formless fluids that tend to entirely occupy a given space uniformly with constant temperatures and pressure.

GROUND ELECTRODES: vertical plates separating ionizers forming the electrically grounded element for the ionizing field that also contain and direct air particles during the ionization process.

HAND: term used to define location of equipment access door, determined by facing unit with air striking the back of the head.

HEADER: Vertical pipe that connects the manifolds from horizontal tier to tier on a wash system.

HEPA FILTER: High Efficiency Particulate Air Filter.

HORSEPOWER: commonly used to refer to the measure of work that can be performed by a given motor.

IMPINGEMENT: striking or impacting of a material on a surface.

INCH OF WATER: unit of pressure equal to the pressure exerted by a column of water under standard atmospheric conditions (27.13" water = 1 psi).

INCLINED MANOMETER: a device used to accurately measure pressure.

INSTABILITY: the point of operation at which a fan or a system will "hunt or pulse", often found when a fan operates 'left of peak' on the static-pressure curve.

INSULATOR: a non-conductive material used to separate electrical components of opposite potential.

IONIZER: portion of a collector cell that places a (+ or -) charge on a particle.

L-XX BEARING LIFE: a theoretical number of hours at which 90% of the bearings subjected to a given set of conditions will still be in operation.

LAMINAR FLOW: gas or fluid moving in parallel layers.

LOWER EXPLOSIVE LIMIT: the lowest concentration of a material in otherwise standard air that will explode when a spark is introduced.

MAGNAHELIC: device used to aid in determining material buildup on a filter as a result of static pressure buildup.

MAKE-UP AIR: the replacement of exhausted air in a ventilation system.

MANIFOLD: copper tube fitted with spray heads for cell wash system.

MEDIA SECTION: module designed to contain mechanical filter media.

METAL MESH: prefilter and after filter with low efficiency, typically used to evenly disperse the air entering a collector cell. Also used to meet code as a safety device to prevent access to an area of high voltage. Also used to contain wash over spray.

MICRON: a unit of measurement equal to one-millionth of a meter, commonly used in dust collection and material handling applications to describe particle size.

NEMA: National Electrical Manufacturers Association, a trade association establishing standards, ratings, dimensions, enclosures and other criteria for electric motors.

NOISE CRITERIA: method by which a design engineer specifies the maximum permissible sound-power level in each of eight octave bands.

PERFORATED PLATE: prefilter and after filter typically used to evenly disperse the air entering a collector cell. Also used to meet code as a safety device to prevent access to an area of high voltage. Also used to contain wash over spray.

PLC: Programmable logic controller, digital device used to monitor and control power and wash sequences. May also control fire systems, dampers and fans.

PHOTOHELIC: device to measure static pressure in a system. Includes high and low set points and is frequently used to initiate a cleaning cycle as material builds up on a media surface and increases the static pressure.

POTASSIUM PERMANGANATE: synthetic substance used as an odor adsorber.

PRECIPITATOR: device used to collect and coalesce mists for removal from an airstream.

PRECOAT: the application of an inert low bulk density, high permeability protective powder coating that when applied to a new cartridge improves efficiency at start-up, prevents small particles from penetrating the media, aids in preventing filter blinding and improves dust cake release in the presence of light oil or moisture. Best to field apply at 3.5 pounds per 1,000 ft² of media for best results.

PREFILTER: (1) Media filter used to capture large particles that may cause rapid loading, or (2) Perforated plate used to diffuse the air entering an air cleaner for even distribution. (3) Used to contain over spray during a wash cycle.

PREFILTER WASH SECTION: module used to wash a perforated or metal mesh prefilter in a heavy loading application such as kitchen grease.

POST FILTER: Perforated plate or metal mesh filter panel used to maintain even air flow, protect against entry into an area of high voltage, contain over spray from a wash cycle.

PWM POWER SUPPLY: solid state electrical device used to convert AC line power to high voltage DC power for use in the ionizer collector cells.

OCTAVE BANDS: frequency ranges (typically used in audible sound) defined by their center frequencies.

OPPOSED BLADE DAMPER: a device used to modulate airflow where adjacent blades rotate in opposite directions. Generally considered to provide the most linear control of all damper designs.

OSHA: Occupational Safety and Health Administration

PITOT TUBE: a device used to measure either static pressure or velocity pressure in a duct system.

PLENUM: an enclosure typically used in an air moving system that allows attachment of inlet or discharge ductwork to a mechanical system, or an enclosure used to house an assemblage of devices used in air movement and or cleaning.

POINT OF OPERATION: the point at which a fan's static pressure curve and the system performance curve intersect. Generally defines a specific cfm and static pressure (CFM & SP).

POLARITY: refers to the charge (+ or -) placed on a plate or particle.

POWER PACK: a complete assemblage of components, including, power supply, all high voltage components, instrumentation, terminal strips and the enclosure.

POWER SUPPLY: sub assembly of the PWM or power pack including the high voltage transformer, and secondary components; diodes, capacitors and resistors.

PSYCHROMETRIC CHART: a set of curves used to graphically depict the relationship between pressure, temperature, and humidity in a gas-vapor mixture for comfort conditioning.

RADIAL BLADE: describes the fan wheel design that positions the blades in a straight radial position from the hub. This design is typically considered the best for material handling due to its self-cleaning properties.

RECLAMATION: the collection of particulate matter in an airstream to be reused in the manufacturing process.

RESTAURANT CONTROLLER: a control specifically designed to initiate a unit wash cycle upon completion of a restaurant cooking cycle and reset to its normal status for the following day.

RPM: revolutions per minute.

SCFM: standard cubic foot of air (0.075 lbs/ft³) per minute.

SCROLL: the fan housing of a centrifugal fan.

SENSIBLE HEAT: commonly refers to dry heat.

SOFT ARC: a millisecond shutdown of the PWM power supply to reduce high voltage current damage to the power supply and collector cell.

SPIKED IONIZER: heavy duty stainless steel ionizer in scalloped design to allow for heavy material loading and frequent washing without breaking.

SRC: spark resistant construction; term used to describe the guidelines, method and materials of construction of a fan or air moving device used to convey potentially explosive or flammable gases, vapors, or particles.

STANDARD AIR DENSITY: (0.075 lbs/ft³), dry air at 70° F and 29.92 inches Hg.

STANDOFF INSULATOR: raised ceramic insulator with special glazing designed to reduce the effects of heavy loading and or mildly conductive material.

STATIC PRESSURE (SP): the force or pressure of an air stream, gas or fluid on the surrounding walls. Used to determine the flow resistance in a duct system for fan selection. Does not include the force or pressure component of moving air.

SWARF: collected material frequently containing abrasion grit, metal fines, general dust and dirt, which may fall to the bottom of a collector cell and form a conductive path.

SYSTEM EFFECT: the effect that a change a duct design has on a system and the resultant fan performance.

SYSTEM CURVE: graphic representation of pressure versus volume flow rate of a particular system

TACHOMETER: instrument used to measure the rpm of a fan wheel or motor.

THRESHOLD LIMIT VALUE (TLV): the value for airborne toxic materials that are used as guidelines in the control of potential health hazards. These guidelines represent the typical concentrations of a given material that most workers can be exposed to for an 8-hour workday for an extended period of time without adverse effects.

TIER: a horizontal row of cells placed one above the other.

TOTAL PRESSURE: (1) the sum of static and velocity pressures when referring to pressure in a duct. (2) The pressure required to move a given airflow through the duct system and/or the air moving and cleaning housing.

TRANSITION: sheet metal conversion from one set of dimensions to another. Typically used to connect a fan to an air cleaner.

TUNNELING: term used to describe uneven airflow in a collector cell.

VAPOR: gaseous form of substances which are normally in the solid or liquid state and which can be changed to these states by either increasing the pressure or decreasing the temperature.

VENTILATION: the process of removing and resupplying air through either natural or mechanical means.

VISCOSITY: the natural resistance of all fluids to resist flow.

TRION
Air Purification Systems

